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# Determinants and Value Relevance of UK CEO Pay Slice

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## Abstract

This paper studies the CEO Pay Slice (CPS) of UK listed firms during the period 2003 to 2009. We investigate the determinants of CPS. We study the links between CPS and measures of firm performance. We find that firms with higher levels of corporate governance ratings and those with more independent boards tend to have higher CPS. In addition, we find that CEOs are more likely to receive lower compensation when they chair the board and when they work in firms with large board size. We also find that higher CPS is positively associated with firm performance after controlling the firm-specific characteristics and corporate governance variables. We get compatible results when we examine the association between equity-based CPS and firm performance. Our results remain robust to alternative accounting measures of firm performance. Our results suggest that high UK CPS levels do indeed reflect top managerial talent rather than managerial power.

**Key words:** CEO pay slice, firm performance, corporate governance ratings, corporate governance mechanisms.

**JEL Classification:** G30; M15

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## **1. Introduction**

Prior research has paid considerable attention to the effect of CEO characteristics on organizational performance. Falato et al. (2011), using reputation, career record, and educational background as proxies for CEO talent, document a positive effect of shareholders wealth on the appointment of talented CEOs, which is consistent with the argument that talented CEOs have superior ability to process economics information and make value-added decisions for shareholders. Chang et al. (2010) examine CEO departure between 1992 and 2002, and find that CEO subsequent labour market success is greater if the firm's pre-departure performance is better and the prior pay is higher. This suggests that CEOs are compensated for their abilities with high remunerations. However, during the negotiation of compensation contract with the board, powerful managers may take advantage of their influence over the board to maximize their personal welfare (Bertrand and Mullainathan 2001; Bebchuk and Fried 2003), which implies that high compensation may reflect the power of managers and indeed indicates weak governance of the firm. Measuring CEO's power with the proportion of the total compensation of top-five highly paid executives captured by CEO (CEO pay slice) in a given firm, Bebchuk et al. (2011) find that CPS is associated with lower firm value and inferior accounting performance. Furthermore, CPS is correlated with lower stock return accompanying acquisition announcement and higher likelihood that CEOs receiving "lucky" option grant. Consistent with the managerial power hypothesis, they conclude that higher CPS is associated with agency problem.

To summarize, high CEO compensation reflected by CPS may imply that CEOs have superior capability or qualification, which enhances their contribution to the firm. Alternatively, high CPS can be explained by the managerial power approach, in that a weak corporate governance structure will lead to an inefficient design of compensation contracts, so powerful CEOs will take this advantage to

maximize their personal benefits. The competing predictions from different theories call for more empirical research on this topic.

In this study, we follow Bebchuk et al. (2011) and Forbes et al. (2014) and measure the relative importance of the CEO using CPS, and test the association between CPS and firm performance in the UK context.<sup>2</sup> Different from Bebchuk et al. (2011), we find that higher CPS is positively associated with firm performance measured by Tobin's Q, after controlling for firm-specific characteristics and governance variables. We also report similar findings when we substitute CPS with equity-based CPS. Our results stay robust if we use accounting measures such as Return on Assets (ROA) and Return on Equity (ROE) to reflect firm performance. We suggest that CEOs of public listed firms in UK are compensated for their talents and capabilities, and the difference between our results and those of Bebchuk et al. (2011) can be explained by the different institutional backgrounds between US and UK. Although The United Kingdom (UK) and the United States (US) share a similarity in diverse corporate ownership structures and generally high quality corporate governance (Wang and Hussainey 2013), recent research argues that the US and UK have very different corporate governance systems (Siepel and Nightingale 2014). A series of reports have been issued to strengthen UK governance system. For example, Cadbury report (1992) addresses the financial aspects of corporate governance and produces a code of best practice for publicly listed companies. Greenbury report (1995), which concentrates on the remuneration of directors, recommends the

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<sup>2</sup> In this study we use CEO pay slice instead of the CEO pay inequality measure developed by Forbes et al. (2014) for two reasons. First, Forbes et al. (2014) calculate a measure of CEO pay inequality as the compensation of the CEO divided by remuneration to all the executives on the board. This measure is inversely associated with the size of the board. Prior research (i.e. Guest 2009) shows that the board size is negatively associated with corporate performance using UK data. As a result, examining the effect of CEO pay inequality on firm performance is vulnerable to the correlated omitted variable problem, because CEO pay inequality and firm performance are related to board size. Second, our focus in this paper is to investigate the association between CEO's relative pay and firm's future performance, and one benefit of using CPS is that we may compare and reconcile our findings to those based on US data (i.e. Bebchuk et al. 2011). If we do not use CPS, it will be difficult to triangulate our results with previous studies.

establishment of remuneration committee comprising entirely of non-executive directors to decide the remuneration of the executive directors.<sup>3</sup> Furthermore, it also recommended that long term incentive schemes paid by firms (including stock options) should be subject to challenging performance criteria. The recommendations of the Greenbury report have been subsequently taken on board by the London Stock Exchange and have been incorporated into the UK listing rules. Hampel report (1998) further requires UK public companies to disclose compensation information of their directors. The recommendations of these three reports were combined to form part of London Stock Exchange Combined code, which regulates all companies listed on the exchange (FRC, Combined Code 2008). Consequently, compared with their counterparts in US, CEOs of UK listed firms are less likely to have strong influence over the remuneration committee during the negotiation of their compensation package. Instead, their compensation is structured to link reward to firm performance, which suggests that CEOs of UK firms are more likely to be compensated for their talents and capabilities that can improve firm performance.

Forbes et al. (2014) investigate the impact of CEO pay inequality on corporate performance using the UK FTSE 100 firms. Our study complements Forbes et al. (2014) in at least three ways. First, we focus on FTSE 250 firms while Forbes et al. (2014) look at FTSE 100 firms. FTSE 100 firms are the largest firms listed on London Stock Exchange (LSE), accounting for over 80% of the entire market capitalization of LSE, whereas FTSE 250 firms are relatively medium firms listed on LSE, representing an important but less researched section of the entire economy. Our inferences based on the analysis of data from FTSE 250 firms provide new insights into the interplay between CEO compensation, corporate governance and firm performance among medium-sized UK firms, which

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<sup>3</sup> The responsibilities of the remuneration committee include: 1) the determination of company-wide policy on remuneration; 2) the determination of individual remuneration package for each executive directors and other senior executives if appropriate; 3) reporting directly to shareholders on behalf of the board of directors on all matters relating to executive remuneration (Hughes 1996).

promotes our understanding of the operation and management of such firms. Second, our inferences are based on the analysis with multiple performance measures (e.g., Tobin's Q and return on equity) but Forbes et al. (2014) draw conclusion only based on return to shareholders. Finally, we extend Forbes et al. (2014) by investigating the impact of CPS on corporate governance using a comprehensive set of governance variables and a larger sample size. We thus contribute to the literature on CEO compensation in the UK setting. Our findings also have implication for the ongoing debate about whether high CEO compensation reflects high managerial talent or managerial power. The positive association between CPS/equity-based CPS and firm performance suggests that CEOs of public listed firms in UK are more likely to be compensated for their managerial talent. Finally, our study enriches the literature by providing evidence that institutional background may play an important role in deciding how CEOs are compensated in different countries.

The remainder of the paper is structured as follows. Section 2 reviews the literature and Section 3 develops the hypotheses; Section 4 describes the data and research method; Section 5 presents the empirical results; Section 6 concludes.

## **2. Literature review**

There is a substantial amount of literature examining the impact of senior managers, in particular CEOs on the organizations they lead. Bertrand and Schoar (2003) find that CEOs have different management styles as they move between firms, and these differences affect corporate decisions including investment, financing and organizational re-structure. Falato et al. (2011) document that talented CEOs (measured with reputation, career record, and educational background) are more likely to cut capital and M&A expenditures and shed excess capacities. Demerjian et al. (2011) measure CEO talent as the efficiency of the CEO in generating revenues with firm resources and find

that employing CEOs with higher ability is associated with improved firm performance in subsequent periods.

Other studies report mixed results on the stock market reaction to the decision of managerial turnover. While Warner et al. (1988) do not find any significant results, Weisbach (1988) documents significant and positive market reaction to turnover decisions. On the other hand, Khanna and Poulsen (1995) find negative effects. Denis and Denis (1995) find stock markets react positively to forced turnover while the reaction to CEO retirement is insignificant. Bennedsen et al. (2010) provide evidence that CEO deaths are associated with declining operating profitability, asset growth, and sales growth. In contrast, the deaths of other board members do not have strong impact on firm performance. Therefore, they conclude that CEOs are important for the success of ongoing operation, and their permanent or temporary absence impacts firm performance.

Managers may claim higher compensation because they have superior ability, or they have more influence over the board when negotiating their compensation packages. Bebchuk and Fried (2003) propose the managerial power approach by arguing that weak corporate governance structure leads to an inefficient design of compensation contracts. For example, compensation for executives including CEOs will be higher in firms where managers have more power, or the board is relatively weak. Therefore, whether higher relative compensation reflects managerial talent or managerial power is an empirical question to be addressed in this study.

A growing stream of literature supports a positive association between corporate governance quality and firm performance. Empirical studies document a positive association between the percentage of independent directors and Tobin's Q (Core et al. 1999). In a similar vein, Conyon and Peck (1998) conclude that board size is negatively associated with corporate performance measured

by return on equity. In terms of insider ownership and firm performance, previous literature reports a positive relationship between insider ownership and firm performance (see for example, Agrawal and Knoeber 1996; Ho 2005). Gompers et al. (2003) find that firms with strong corporate governance have higher value. Furthermore, stock returns of firms with good corporate governance outperform those of firms with weak governance. Bebchuk et al. (2009) identify six provisions to create an “entrenchment index (E-index)”.<sup>4</sup> They show that stock returns are lower for firms with higher E-index score. Overall the literature suggests that firms with good governance tend to have higher value.

Beyer et al. (2010) state that the stewardship role allows capital providers to manage and utilize their invested capital in a certain firm. Using a corporate governance disclosure index as a proxy for the quality of corporate governance, Cheung et al. (2011) find that firms with higher quality of corporate governance exhibit a subsequent increase in market value, whereas those with lower quality of corporate governance exhibit a decrease in market value. This suggests that the quality of corporate governance affects stock market participants when valuing firms. Sheu et al. (2011) focus only on one particular type of corporate governance mechanisms (i.e. information related to compensation paid to directors and executives). They find that the stock market participants provide a higher valuation for those firms which disclose more information about their compensation practices.

In the present study, we follow Cheung et al (2011) and Sheu et al. (2011) and consider corporate governance practice, measured by corporate governance ratings, when examining the association

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<sup>4</sup> Among the six provisions, four limit shareholder rights (staggered boards, limits to shareholder amendments of bylaws, supermajority requirement for merger and charter amendment) and the other two make potential hostile takeover more difficult (poison pills and golden parachute). Therefore, higher index score implies that the firm is entrenched, or has weak governance.



between CPS and firm performance. Prior research shows that corporate governance practice is associated with lower cost of external capital (Anderson et al. 2003; Bhojraj and Sengupta 2003; Anderson et al. 2004; Klock et al. 2005; Cremers et al, 2007; Chava et al. 2009; Lorca et al. 2011). For example, cheap external funding might not be a major concern for large firms, as a result, offering more information to stock market participants may help to alleviate the litigation risks, reduce the volatility of stock price fluctuations, and enhance the management talent, signalling effects which will have an impact on the firms' valuation.

### **3. Hypothesis development**

Following Bebchuk et al. (2011), we measure the relative importance of the CEO with CEO pay slice (CPS), which is the percentage of the total compensation of top-five executives that is captured by the CEO. We also compute the equity-based CPS as the percentage of the total equity-linked compensation of top-five executives that is captured by the CEO. It is essential to note that as CPS is computed using the compensation information of executives from the same firm, it automatically controls for the firm-specific characteristics that affect the average level of compensation that varies from firm to firm or industry to industry. However, the characteristics of CEO (e.g., talent and expertise) may still have an effect on CPS. For example, using a sample of executives who switched jobs between 1992 and 2007, Carter et al. (2010) find that talented executives received pay premiums at their new employer, after controlling for the standard determinants of compensation.<sup>5</sup>

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<sup>5</sup> Carter et al. (2010) use two sets of proxies to capture the talent of executives. The first set of variables captures characteristics of the executives' managerial position and professional profile at the prior firm, while the second set of variables measure firm performance and financial reporting quality of the executives' former employer over their managerial tenure.

Regarding the association between CPS/equity-based CPS and firm performance, we develop two competing hypotheses based on different theories. According to the managerial talent hypothesis, higher CPS may imply the outstanding talent and ability of the CEO, which can contribute to strong performance of the firm. Falato et al. (2011) show that the CEO's total compensation is an increasing function of the CEO's talent. CEO, as the most important executive in a firm, is playing a crucial role in making corporate decisions and is taking the major responsibility to maximize shareholder's wealth. Talented CEO is able to claim higher compensation relative to other executives in the firm, because CEO's judgement and expertise can make a difference in decision-making that affects future prospects of the firm. Furthermore, talented CEOs may have better outside opportunities, so higher compensation is necessary to increase the opportunity cost of voluntary departure.

Consistent with the managerial power hypothesis, CEO might have more power when the corporate governance is weak (e.g., less independent board), which can be reflected by higher CPS. Bebchuk and Fried (2003) suggest that CEOs are more likely to take advantage of their power to negotiate an excessive compensation package with the board. As a result, the CPS is more likely to skew to the excessive side, which signals governance/agency problem in a firm. The weak corporate governance may have negative effect on firm performance (Conyon and Peck 1998; Ho 2005; Brown and Caylor 2006).

In this study we also look into this aspect but from corporate governance ratings perspectives. Corporate governance ratings have been widely used in the governance-performance literature (see for example Ben Amar and Boujenoui 2011; Epps and Cereola 2008; Drobetz et al. 2004; Ertugrul and Hegde 2009). Bozec and Bozec (2012) find that a consistent finding across all governance-performance studies is that there is a positive association between governance ratings and firm performance. Furthermore, prior research suggests that good governance practices mitigate the

under-valuation of accounting earnings (Chen and Kao 2010). Finally, different studies (e.g. Cheung et al. 2011; and Sheu et al. 2011) examine the effect of corporate governance disclosure on firm value and their findings are consistent with the argument of Healy et al. (1999). In particular, they find a positive association between corporate governance disclosure and firm value. Based on the above discussion, we propose the following hypotheses:

Managerial talent hypothesis (H1a): *Higher level of CPS is positively associated with future firm performance.*<sup>6</sup>

Managerial power hypothesis (H1b): *Higher level of CPS is negatively associated with future firm performance.*

H2: *Higher level of corporate governance ratings is positively associated with future firm performance.*

## **4. Research design**

### **4.1 Data**

Our study focuses on FTSE 250 firms in UK.<sup>7</sup> We first collect data on CEO compensation from the BoardEx database.<sup>8</sup> CPS is calculated as follows: first, we compute the total annual compensation of each executive for a sample firm as the sum of direct compensation and total equity linked compensation (including the Black and Scholes value of the options granted, payouts of long-term incentive plans and equity-based long-term compensation). Next, we select the value of

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<sup>6</sup> We regress firm performance in year  $t+1$  on CPS in year  $t$  in the empirical analysis.

<sup>7</sup> Consistent with previous literature, we exclude financial institutions and utility firms.

<sup>8</sup> UK publicly listed firms are required by the Directors' Remuneration Report Regulations (2002) to disclose information on executive as well as non-executive's compensation (including cash compensation, share options and long-term incentive schemes) in a separate "Director's remuneration report" as part of the annual report.

compensation of five most highly paid executives for one firm in a given fiscal year.<sup>9</sup> CPS is the percentage of the CEO's compensation divided by the compensation of the five executives. Then we replace the total compensation with equity-linked compensation and compute the equity-based CPS.

For the corporate governance disclosure index, we follow the recent paper of Al-Najjar and Ding (2014) by using the RiskMetrics Group. This database contains 55 CGQ governance factors which cover eight categories of corporate governance including board, compensation, takeover, and audit. We compute an overall measure of corporate governance quality score (Al-Najjar and Ding, 2014). CGQ provides corporate governance ranking for more than 7,500 firms worldwide since 2003. Therefore, our sample period covers 2003-2009, as 2009 is the most recent year when the data are available. Other corporate governance data such as board size, board independence and institutional ownership are collected from annual reports.<sup>10</sup> Capital market data including Tobin's Q, leverage, return on asset (ROA), return on equity (ROE), market to book ratio, total assets and capital expenditure are collected from DataStream, and we match the firm-specific data with CPS using firm name. Our final sample consists of 130 firms.

## ***4.2 Research Method***

### ***4.2.1 The determinant of CPS***

In order to investigate whether CEOs are highly paid thanks to their overwhelming managerial power, we regress CPS on corporate governance quality index reflected by CGI, CEO characteristics, board characteristics and firm-specific variables. We use the following model:

$$CPS_{i,t} = \alpha_0 + \alpha_1 CGI_{it} + \alpha_2 CEOCharacteristics_{it} + \phi Inown + \gamma BoardCharacteristics_{it} + \lambda Controls_{it} + \varepsilon_{it} \quad (1)$$

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<sup>9</sup> We drop firms for which CEO is not among the five most highly paid executives.

<sup>10</sup> We follow the corporate governance literature by including board size, board independence and institutional ownership in our models (see for example McConnell and Servaes, 1990; Larmou and Vafeas, 2010).

CPS is the CEO pay slice measured as the percentage of the total compensation of top-five executives that is captured by the CEO; CGI is the value of corporate governance disclosure score; CEO Characteristics include CEO tenure (number of years since becoming CEO), CEO chair (duality) and CEO gender. Board characteristics include board independence and board size. We also add institutional ownership (Inown) to our models. Controls are firm-specific characteristics including size, leverage, market-to-book ratio, risk (captured by beta), Tobin's Q, ROE and ratio of capital expenditure to total assets. We also include year dummies and industry dummies in the regression, and the standard errors are clustered at firm level. If the managerial power prediction holds, we expect CPS to be negatively associated with CGI, because high CGI indicates better quality of corporate governance. Furthermore, according to managerial power story CPS is likely to be higher when the board is weak (e.g., less independent). Finally, we substitute CPS with equity-based CPS (ECPS) and repeat the analysis.

#### ***4.2.2 CPS and firm performance***

First, following a substantial literature that measures firm performance with Tobin's Q (Lang and Stulz 1994; Core et al. 1999; Gompers et al. 2003; Brown and Caylor 2006), we measure firm performance in *year t+1* with Tobin's Q, which is calculated as the market value of common equity plus the book value of preferred equity and long-term debt divided by the book value of assets. To control for possible endogeneity between firm performance and the corporate governance factors, we use the Instrumental Variable (IV) model to test our hypotheses. The instrument variables used in the model are the first lag of the corporate governance variables, and the standard errors are clustered at the firm level.<sup>11</sup> We also control for the non-linear relationship between board size and institutional ownership by including their square terms. In the regression we include year dummies and industry

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<sup>11</sup> The Shea partial  $R^2$  for the instrument variables in all our models is higher than 0.50. In addition, the first stage regression in our models indicates a good significant level and power. Hence the instruments in our case are not weak.

dummies to control for secular trends and industry-specific confounding effects, but for brevity we do not report their coefficients in the tables.

$$Tobin's Q_{i,t+1} = \beta_0 + \beta_1 CPS_{it} + \beta_2 Cgidum_{it} + \beta_3 INTERACTION_{it} + \gamma CGVD_{it} + \lambda Controls_{it} + \varepsilon_{it} \quad (2)$$

We create Cgidum as a dummy variable that takes one for observations with their value of corporate governance ratings score above the sample mean, zero otherwise. Following Cheung et al (2011) and Sheu et al (2011), we expect a positive association between Cgidum and Tobin's Q. INTERACTION is the interaction between CPS and Cgidum. Following Hussainey and Walker (2009), we identify four logical possibilities for the interaction between CPS and Cgidum. First, if Cgidum and CPS are different ways of conveying the same information (substitutes), then the coefficient on CPS will be equal to the coefficient on Cgidum. In addition, the INTERACTION should be negative and equal in absolute value to the coefficients on CPS or Cgidum.

Second, if Cgidum and CPS convey unrelated types of information then performance for firms that have high levels of Cgidum and lower CPS should be stronger than performance for firms that have high levels of both Cgidum and CPS. Similarly, firm performance should be stronger when both high levels of Cgidum and low CPS are present than when only the high levels of Cgidum is present. In this case both Cgidum and CPS provide ('additive') unrelated information, so we predict the INTERACTION should be positive and insignificantly different from zero.

Third, if Cgidum and CPs provide complementary information that is reinforcing, then the interaction should be significantly larger than zero, because firms with either good internal governance reflected by high Cgi or larger proportion of executive compensation claimed by CEO tend to have better performance. However, if the coefficient of interaction is positive, we expect that the sum of coefficients of Cgidum, CPS and INTERACTION should be significantly greater than the sum of coefficients of Cgidum and CPS.

Finally, if Cgidum and CPS convey related information, but some of the information is common to both (partially additive), then performance for firms that have high levels of Cgidum and low CPS should be higher than performance of those that have high levels of Cgidum but pay high CEO compensation. Similarly, firm performance should be higher when both higher Cgidum and lower CPS are present. In this case, one may predict that the INTERACTION should be significantly less than zero. In other words, the sum of Cgidum, CPS and INTERACTION should be significantly less than the sum of the coefficients on Cgidum and CPS. The inference is that both CPS and Cgidum are partial substitutes.

In Model (2), we control for a number of corporate governance mechanisms and firm characteristics. CGVD refers to corporate governance mechanisms. These include board size, board independence and institutional ownership. We also control for leverage (total debt divided by total assets); ROE (net income divided by total equity); investment opportunities (capital expenditure divided by total assets); growth opportunities (market-to-book ratio); firm size (logarithm of total assets) and firm risk (beta). The coefficients of interest are  $\beta_1$  and  $\beta_3$ .

Next, we substitute CPS with equity-based CPS (ECPS) and re-run the model with the necessary modifications of the interaction term. Consistent with previous literature that utilizes accounting measures to reflect firm performance (e.g., Larcker et al. 2007; Bebchuk et al. 2010), we replace Tobin's Q with ROE (net income divided by total equity), and re-estimate the model with the following regressions:<sup>12</sup>

$$ROE_{i,t+1} = \delta_0 + \delta_1 CPS_{it} + \delta_2 Cgidum_{it} + \delta_3 INTERACTION_{it} + \gamma CGVD_{it} + \lambda Controls_{it} + \varepsilon_{it} \quad (3)$$

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<sup>12</sup> We exclude ROE as one of the control variable in these analyses.

## 5. Results

### 5.1 Summary statistics and correlation

Table 1 provides the summary statistics of the variables. The mean of CPS (ECPS) is 0.43 (0.44), which suggests that on average CEO compensation represents 43% (44%) of the total compensation of the five most highly-paid executives within a firm. The mean of corporate governance disclosure score (CGI) is 86.64, indicating that on average firms have relatively good record on corporate governance quality. The average board has around 8 members, while 48% of board members are independent. The percentage of ownership by institutional investors is 16.67%. ROE (return on equity) is 17.41% for the average sample, which suggests that the sample firms have relatively strong performance. The average capital expenditure is 4.2% of total assets and average market-to-book ratio is 2.84.

<< Insert Table 1 about here >>

Table 2 reports the pair-wise correlation between the variables. Tobin's Q is positively related with ROE, as firms with higher accounting performance also have better valuation (performance). Tobin's Q is positively correlated with institutional ownership, as institutional investors have reduced cost to monitor the management, which contributes to firm performance. Tobin's Q is negatively related to leverage and firm size. Importantly, CPS and ECPS are significantly correlated, as nowadays equity-linked compensation takes an increasing proportion of total compensation for executives. The correlation between CPS (ECPS) and corporate governance disclosure score (CGI) is positive and significant. CPS (ECPS) is also positively correlated with firm size, consistent with the view that large firms compensate CEOs with higher remuneration. Corporate governance disclosure score is positively correlated with board independence and firm size, which suggests that large firms and independent boards are likely to improve quality of corporate governance. The correlation



between board size and firm size is positive and significant, as large firms are likely to have big boards. Finally, board independence is positively related to firm size, as large firms are expected to have more independent boards. Table 2 shows that the correlations between variables are low to moderate, which suggests that multicollinearity is not a serious concern in our specification.

<< Insert Table 2 about here >>

## **5.2 The determinant of CPS**

We investigate in this Section the link between corporate governance and CEO pay slice. This issue has been investigated in previous studies and it is reported that there is an important link between corporate governance and CEO pay (Guy 2005; Forbes et al. 2014). Following Forbes et al. (2014) who investigate the impact of board specifications on CPS, Table 3, Panel A provides the regression results with CPS as dependent variable and CGI, CEO characteristics, board characteristics (board independence and board size), institutional ownership and firm-specific variables as explanatory variables. In Model 1 we include CGI, CEO characteristics, institutional ownership, board independence and board size. In Model 2 we add the square terms of board size and institutional ownership to control for possible non-linear relationship between CPS and board size and institutional ownership. In Model 3 we further add firm-specific variables (size, leverage, market-to-book, risk, Tobin's Q, ROE and capital expenditure) as additional controls. Across the models the coefficient of CGI (corporate governance disclosure score) is positive and significant, which suggests that CEOs at firms with high quality governance are likely to claim higher relative compensation. The coefficient of CEOChair is negative and significant across the models, which implies that CEOs get lower compensation when they chair the board. This can be explained by the institutional background in UK, as CEOs don't have undue influence over the remuneration committee to decide their compensation even if they lead the board. Furthermore, the coefficient of board independence is positively significant across the models, indicating that firms with more

independent board are likely to reward CEOs with high relative remuneration. The coefficient of board size is negative and significant, which suggests that CEOs are more likely to receive lower compensation in firms with large board. It is plausible that large board strengthens the governance and increases the monitoring of the CEOs. Regarding the coefficients of the firm-specific variables, none of them are significant. Our findings are broadly consistent with those reported in Bebchuk et al. (2010), because leverage, market-to-book and capital expenditure are not significantly related to CPS in their analysis.

We replace the dependent variable with ECPS and re-estimate the regressions. The results are reported in Table 3, Panel B. Consistent with findings based on CPS, the coefficient of CGI (corporate governance disclosure score) is positively significant and the coefficient of board independence is strongly positive across the models, which confirms that CEOs are more likely to get higher relative compensation when the governance quality of the firm is higher and the board is more independent. The coefficient of board size is significantly negative in Models 1 and 2, while the coefficient of CEOChair is negative and significant in Model 1. Similar to results in Panel A, none of the coefficients of firm-specific variables are significant.

Overall our findings are at odds with the prediction of managerial power hypothesis, which argues that CEOs are likely to receive high relative compensation in firms with poor governance because they have increasing negotiation power over the board. In contrast, we find that firms with high quality of governance reflected by higher CGI and more independent boards are likely to reward CEOs with high remuneration. Furthermore, CEOs receive lower compensation when they chair the board of directors. It is likely that the strengthened internal governance of UK public corporations reduced the influence and negotiation power of CEOs, so they do not get higher remuneration due to their managerial power.

<< Insert Table 3 about here >>

### ***5.3 Results on the association between CPS and firm performance***

We discuss the results on the association between CPS (equity-based CPS) and Tobin's Q in 5.3.1, results on the association between CPS (equity-based CPS) and ROE in 5.3.2, and results on the association between CPS (equity-based CPS) and sub-index related to board, compensation and takeover in 5.3.3.

#### ***5.3.1 Results on the association between CPS/ECPS and Tobin's Q***

We run six models with Tobin's Q as the dependent variable, and present the results in Table 4. In Models 1 to 3 (Models 4 to 6) CPS (Equity-based CPS) is included as the explanatory variable of central interest. To control for the possible curvilinear relationship between corporate governance variables and firm performance, in Model 1 we include the square term of board size and institutional ownership. Year dummies and industry dummies are introduced to control for the secular trend and industry-specific effect. In Model 2, we leave out the square terms of board size and institutional ownership. In Model 3, we retain the square of board size and institutional ownership but skip the year-indicators. In Model 1 the coefficient of CPS is positive and significant (1.530,  $P=0.05$ ), which suggests a positive association between future firm valuation measured by Tobin's Q and CPS. The coefficients of Cgidum and the interaction term between Cgidum and CPS are both insignificant. The results in Model 2 are similar to those in Model 1, in that coefficient of CPS is positive and significant (0.294,  $P=0.10$ ). Coefficients of Cgidum and interaction are again insignificant. Finally, the results in Model 3 confirm the positive association between CPS future firm valuation measured by Tobin's Q, and the coefficients of Cgidum and the interaction term remain insignificant. We repeat the analysis in Models 4 to 6 where ECPS is the explanatory variable of main interest. In Model 4 the coefficient of ECPS is significantly positive (1.306,  $P=0.05$ ), and in Model 6 the coefficient of ECPS remains positive and significant (1.519,  $P=0.01$ ). The coefficient of ECPS in Model 5 is positive but insignificant. The findings suggest that CEOs who are able to

contribute to the future performance of their firms get relatively high equity-linked compensation. In Models 4 to 6 the coefficients of Cgidum and the interaction term between Cgidum and ECPS remain insignificant. Overall our findings lend support to H1a (the managerial talent hypothesis), as CEOs are compensated for their superior talent and skills, which contributes to better firm valuation in the future.

Among the control variables, the coefficient of board size is positive and significant across the regressions except for Models 3 and 6. It is likely that large board consisting of members with diversified expertise and experience can support managerial decision-making, which in turn contributes to firm value. This finding is in line with Larmou and Vafeas (2010), who report a positive association between board size and firm value. However, board size is positively related to the cost of information sharing and monitoring, which implies that when the board becomes larger, the positive effect on firm value gradually weakens. After crossing a certain threshold, the effect of board size on firm value could even turn into negative. This is supported by our results that the square term of board size is negatively associated with firm value. Such finding is also consistent with the non-linear relationship between corporate governance and firm performance documented by previous literature (McConnell and Servaes 1990), the coefficient of the square of board size is negative and significant in Models 1 and 4. The coefficient of firm size is negative and significant across the regressions. Finally, the coefficient of MB (market-to-book) is strongly positive across the six models, which suggests that firms with higher growth opportunity are likely to have higher firm valuation.

<< Insert Table 4 about here >>

### **5.3.2 Results on the association between CPS/ECPS and ROE**

We run six models with ROE (return on equity) as the dependent variable. Consistently, in Models 1 to 3 (Models 4 to 6) CPS (equity-based CPS) is included as the explanatory variable of main interest. The results are provided in Table 5. In Model 1 the coefficient of CPS is positive and significant (20.823,  $P=0.10$ ), which suggests a positive association between CPS and future accounting performance measured by ROE. In Model 2 the coefficient of CPS is positive and significant (17.036,  $P=0.05$ ). Finally, the results in Model 3 confirm the positive association between CPS and future accounting performance reflected by ROE (20.023,  $P=0.05$ ). The coefficients of Cgidum remain insignificant while the interaction is negatively associated with ROE in Models (1) and (3).

We repeat the regressions in Models 4 to 6 where ECPS is the variable of central interest. In Models 4 and 6 the coefficients of ECPS is significantly positive (15.516,  $P=0.05$ ; 16.528,  $P=0.05$ ), and in Model 5 the coefficient of ECPS is positive but insignificant. In Models 4 to 6 the coefficients of Cgidum and the interaction between Cgidum and ECPS remain insignificant. Overall our results, which are consistent with findings based on Tobin's Q, support H1a, as firms with high CPS/ECPS tend to have better accounting performance measured by ROE.

Regarding the control variables, the coefficient of board size is positive but insignificant. The coefficient of risk is negative and significant across the models, indicating that more risky firms have lower future performance. Finally, the coefficient of MB (market-to-book) is strongly positive across the models, which suggests that firms with higher growth opportunity have better future performance measured by ROE.

<< Insert Table 5 about here >>

### ***5.3.3 Results on the association between CPS/ECPS and sub-index related to board, compensation and takeover***

Finally, we replace CG index (CGI) with sub-index related to board, compensation and takeover, and test whether these sub-indices have an impact of CPS (Models 1 and 2) and ECPS (Models 3 and 4). The results, which are reported in Table 6, are generally consistent with early findings. In Models 1 the coefficient of board-sub is positive and significant (0.026,  $P=0.05$ ), which suggests a strong and effective board reflected by a higher board sub-index is positively associated with CPS. In Model 2, we do not include the year and industry dummies, and find largely consistent results (the coefficient of board-sub is 0.023  $P=0.10$ ). We also report evidence supporting a non-linear relationship between board size and CPS, as the coefficients of board size are significantly negative while the coefficients of square term of board size are significantly positive in both Models 1 and 2. The findings related to control variables are broadly consistent with those reported in Table 3.

We re-estimate the regressions in Models 3 and 4 by substituting CPS with ECPS. In Models 3 and 4 the coefficients of board-sub are significant and positive (0.029,  $P=0.10$ ; 0.024,  $P=0.10$ ), suggesting that an effective board is positively associated with ECPS. The results pertaining to control variables are also consistent with those reported in Table 3.

<< Insert Table 6 about here >>

## 6. Conclusion

We follow Bebchuk et al. (2011) and measure the relative importance of the CEO with the percentage of the total compensation of five highly paid executives that is captured by the CEO (CPS). High CPS may indicate that the CEO has superior capability or skills, which enhances his/her contribution to the firm (managerial talent hypothesis). Alternatively, high CPS can be explained by the managerial power approach, since weak corporate governance structure will lead to inefficient design of compensation contract, thus powerful CEOs will take this advantage to maximize their remuneration.

Based the analysis on a sample of non-financial UK firms, we show that higher CPS is positively associated with firm performance measured by Tobin's Q after controlling the firm-specific characteristics and governance variables that have been documented to affect performance. We report similar results when we examine the association between equity-based CPS and firm performance. Our results remain unaffected when we use return on assets and return on equity to reflect accounting performance of the firm. Our findings largely support the managerial talent hypothesis, as CEOs of listed firms in UK with outstanding capability and skills are able to enhance firm performance and are thus rewarded with relatively higher compensation. We interpret the difference between the findings of Bebchuk et al. (2011) and ours with the different institutional background between US and UK: since 1990's a series of reports have been issued to strengthen the internal governance of public corporation in UK. In particular, the Greenbury report, which was issued in 1995, recommends the establishment of remuneration committee comprising entirely of non-executive directors to decide the remuneration policy and the remuneration of individual executive directors. As a result, relative to their counterparts in the US, UK CEOs are less likely to have overwhelming influences on the remuneration committee when negotiation their compensation package. Instead, they are likely to be compensated for their managerial talent and capability. Finally,

we find limited evidence of substitutive relationship between CPS/ECPS and corporate governance disclosure quality. We further show that firms with better corporate governance disclosure tend to have higher CPS, suggesting that talented CEOs are more likely to be employed by well-governed firms.

Our study contributes to the literature in the following ways. First, we corroborate findings of early studies on CEO compensation and firm performance in the UK and contribute to the ongoing debate about whether high CEO compensation reflects high managerial talent or managerial power. The positive association between CPS/equity-based CPS and firm performance suggests that CEOs of public listed firms in UK are more likely to be compensated for their managerial talent and capability. Second, we enrich the literature by providing evidence that institutional background may play a key role in deciding how CEOs are compensated in different countries.

Our study is subject to several limitations, however. First, although we take the standard instrumental variable approach to mitigate the potential endogeneity problem in our analysis, we are unable to rule out the endogeneity problem in our model. Second, our tests are based on a relatively small sample of 130 firms. Third, our sample period (2003-2009) falls into the post-corporate governance reform era in UK, so we are not able to disentangle the effect of the reform on the association between CEO compensation and firm performance. Finally, different corporate governance proxies can be used to investigate their effects on different measurers of firm performance and value. We leave this for future research.



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Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Tobin's Q	1.47	1.43	0.00	25.26
CPS	0.43	0.15	0.002	1.00
ECPS	0.44	0.18	0.0005	1.00
CGI	86.64	11.64	0.00	100
Cgidum	0.41	0.49	0.00	1.00
Bsize	8.34	2.15	1.00	20.00
Independ	0.48	0.12	0.00	0.78
Inown	16.67	15.50	4.92	73.40
Lev	0.27	0.60	0.00	8.39
ROE	17.41	16.29	-66.34	76.71
Capexp	0.04	0.03	-0.04	0.19
MB	2.84	4.45	-99.60	18.78
Size	5.82	0.60	1.16	7.91

Tobin's Q is the market value of common equity plus the book value of preferred equity and long-term debt divided by the book value of assets, CPS is the CEO pay Slice measured as the percentage of the total compensation of top-five executives that is captured by the CEO; ECPS is the equity-based CEO pay Slice measured as the percentage of the total equity-based compensation of top-five executives that is captured by the CEO; Cgidum is a dummy variable that takes one for observations with their value of corporate governance reporting index above the sample mean, zero otherwise; Bsize is the board size measured by number of directors in the board; Independ is the percentage of independent directors in the board; Inown is the percentage of institutional ownership; Lev is total debt to total asset ratio; ROE is the ratio of net income to total equity; Capexp

is ratio of capital expenditures to total assets MB is market to book ratio, Size is natural logarithm of total assets.

Table 2: Correlation

	1	2	3	4	5	6	7	8	9	10	11	12
<b>1. Tobin's Q</b>	1.00											
<b>2. CPS</b>	-0.12***	1.00										
<b>3. ECPS</b>	-0.11***	0.96***	1.00									
<b>4. CGI</b>	-0.06	0.10**	0.10**	1.00								
<b>5. BSize</b>	-0.05	-0.22***	-0.20***	-0.10**	1.00							
<b>6. Independ</b>	-0.11***	0.29***	0.26***	0.12***	-0.05	1.00						
<b>7. Inown</b>	0.13***	0.003	-0.01	-0.02	0.09**	-0.05	1.00					
<b>8. Lev</b>	-0.07**	0.02	0.02	0.10**	-0.27***	-0.32***	-0.12***	1.00				
<b>9. ROE</b>	0.15***	-0.02	-0.03	-0.01	-0.004	0.02	-0.03	-0.05	1.00			
<b>10. Capexp</b>	0.050	0.04	0.05	-0.002	-0.08**	0.06*	0.05	-0.11***	0.10***	1.00		
<b>11. MB</b>	0.32***	0.01	0.002	-0.02	-0.06*	0.03	0.04	-0.10***	0.26	0.03	1.00	
<b>12. Size</b>	-0.39***	0.06*	0.07*	0.09**	0.39***	0.38***	-0.13***	-0.43***	-0.36***	-0.03	-0.04	1.00

Tobin's Q is the market value of common equity plus the book value of preferred equity and long-term debt divided by the book value of assets, CPS is the CEO pay Slice measured as the percentage of the total compensation of top-five executives that is captured by the CEO; ECPS is the equity-based CEO pay Slice measured as the percentage of the total equity-based compensation of top-five executives that is captured by the CEO; Cgidum is a dummy variable that takes one for observations with their value of corporate governance reporting index above the sample mean, zero otherwise; Bsize is the board size measured by number of directors in the board; Independ is the percentage of independent directors in the board; Inown is the percentage of institutional ownership; Lev is total debt to total asset ratio; ROE is the ratio of net income to total equity; Capexp is ratio of capital expenditures to total assets MB is market to book ratio, Size is natural logarithm of total assets.

Table 3, Panel A: Regression Results on determinant of CPS.

Dependent Variable: CPS	Model (1)		Model (2)		Model (3)	
	Coef.	SE	Coef.	SE	Coef.	SE
CGI	0.001**	0.0001	0.001**	0.0001	0.001**	0.000
CEOTen	0.001	0.002	0.001	0.002	0.001	0.002
CEOChair	-0.103***	0.039	-0.101*	0.060	-0.075	0.064
CEOGen	-0.015	0.025	-0.016	0.025	-0.046	0.040
Inown	0.001	0.001	0.001	0.002	0.001	0.002
Independ	0.420***	0.072	0.439***	0.081	0.393***	0.089
Bsize	-0.025***	0.005	-0.034*	0.018	-0.088***	0.034
Bsize <sup>2</sup>			0.001	0.001	0.003*	0.002
Inown <sup>2</sup>			0.000	0.000	0.000	0.000
Lev					-0.004	0.089
MB					-0.003	0.005
Tobin					-0.007	0.015
ROE					0.000	0.001
Capexp					0.066	0.370
Size					0.031	0.032
Risk					0.002	0.015
Cons	0.391***	0.071	0.414*	0.087	0.607***	0.228
Year dummies	Yes		Yes		Yes	
Industry dummies	Yes		Yes		Yes	
Number of clustered firms	130.000		130.000		130.000	
R <sup>2</sup>	0.259		0.260		0.280	

CPS is the CEO pay slice measured as the percentage of the total compensation of top-five executives that is captured by the CEO; CGI is the value of corporate governance disclosure index; CEOTen is CEO tenure, CEOChair is a dummy variable that takes one if CEO is the chair of the board, zero otherwise; CEOGen is a dummy variable is CEO is male, zero otherwise. Inown is the percentage of institutional ownership; Independ is the percentage of



independent directors in the board; Bsize is the board size measured by number of directors in the board; Bsize<sup>2</sup> and Inown<sup>2</sup> are the squares of the board size and percentage of institutional ownership, respectively; Lev is total debt to total asset ratio; MB is market to book ratio, Size is natural logarithm of total assets; Tobin's Q is the market value of common equity plus the book value of preferred equity and long-term debt divided by the book value of assets; ROE is ratio of net income to total equity; Capexp is ratio of capital expenditures to total assets. Size is natural logarithm of total assets; Standard errors are clustered at firm level.

\*\*\*, \*\*, \* indicate coefficient is significant at 1 %, 5 %, and 10 % levels respectively.

Table 3, Panel B: Regression results on determinant of ECPS

Dependent Variable: ECPS	Model (1)		Model (2)		Model (3)	
	Coef.	SE	Coef.	SE	Coef.	SE
CGI	0.001**	0.001	0.001**	0.001	0.001*	0.0001
CEOTen	0.000	0.002	0.0001	0.002	0.0001	0.002
CEOChair	-0.101**	0.041	-0.095	0.064	-0.074	0.068
CEOGen	-0.018	0.027	-0.019	0.027	-0.050	0.043
Inown	0.000	0.001	0.001	0.002	0.001	0.002
Independ	0.445***	0.078	0.454***	0.086	0.409***	0.096
Bsize	-0.027***	0.006	-0.033*	0.019	-0.082**	0.040
Bsize <sup>2</sup>			0.000	0.001	0.003	0.002
Inown <sup>2</sup>			0.000	0.000	0.000	0.000
Lev					-0.014	0.100
Mb					-0.003	0.005
Tobin					-0.006	0.016
ROE					0.000	0.001
Capexp					0.070	0.397
Size					0.035	0.035
Risk					-0.002	0.015
Cons	0.415***	0.075	0.429***	0.093	0.574**	0.261
Year dummies	Yes		Yes		Yes	
Industry dummies	Yes		Yes		Yes	
Number of clustered firms	130.000		130.000		130.000	
R <sup>2</sup>	0.310		0.310		0.330	

ECPS is the equity-based CEO pay slice measured as the percentage of the total equity-based compensation of top-five executives that is captured by the CEO; CGI is the value of corporate governance disclosure index; CEOTen is CEO tenure, CEOChair is a dummy variable that takes one if CEO is the chair of the board, zero otherwise; CEOGen is a dummy variable is CEO is male, zero otherwise. Inown is the percentage of institutional ownership; Independ is the percentage of independent directors in the board; Bsize is the board size measured by number of directors in the board;  $Bsize^2$  and  $Inown^2$  are the squares of the board size and percentage of institutional ownership, respectively; Lev is total debt to total asset ratio; Risk is measured by firm's historical beta; MB is market to book ratio, Size is natural logarithm of total assets; Tobin's Q is the market value of common equity plus the book value of preferred equity and long-term debt divided by the book value of assets; ROE is ratio of net income to total equity; Capexp is ratio of capital expenditures to total assets; Standard errors are clustered at firm level.

\*\*\*, \*\*, \* indicate coefficient is significant at 1 %, 5 %, and 10 % levels respectively.



Table 4: Regression results with Tobin's Q as the dependent variable

Dependent Variable: Tobin's Q	(1)		(2)		(3)		(4)		(5)		(6)	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Independ	-0.828	1.298	-0.706	0.678	-1.488	1.194	-0.829	1.270	-0.709	0.676	-1.480	1.169
Bsize	3.298***	1.209	0.110**	0.047	2.502**	0.992	3.203***	1.162	0.110**	0.047	2.420***	0.962
Inown	-0.036***	0.038	-0.004	0.004	-0.028	0.035	-0.036	0.038	-0.004	0.004	-0.028	0.035
CPS	1.530**	0.769	0.294	0.348	1.742***	0.620						
ECPS							1.306*	0.657	0.266	0.328	1.519***	0.538
Cgidum	0.143	0.278	0.082	0.178	0.100	0.272	0.079	0.265	0.072	0.173	0.042	0.257
Interaction	-0.976	0.638	-0.259	0.385	-0.932	0.598						
Interaction2							-0.790	0.575	-0.232	0.361	-0.764	0.544
bsize <sup>2</sup>	-0.175***	0.065			-0.132**	0.055	-0.170***	0.063			-0.128***	0.053
inown <sup>2</sup>	0.001	0.001			0.0001***	0.001	0.001	0.001			0.0001	0.001
Lev	1.514**	0.756	0.784**	0.377	0.972	0.642	1.489**	0.738	0.783**	0.377	0.954	0.633
Roe	-0.005	0.007	-0.004	0.005	-0.002	0.008	-0.005	0.007	-0.004	0.005	-0.002	0.008
Capexp	4.095*	2.491	0.928	1.428	2.397	2.205	3.982*	2.436	0.925	1.426	2.348	2.162
Mb	0.236***	0.063	0.235***	0.052	0.239***	0.060	0.236***	0.063	0.236***	0.051	0.240***	0.059
Size	-1.750***	0.428	-1.158***	0.214	-1.447***	0.289	-1.726***	0.416	-1.156***	0.214	-1.429***	0.284
Risk	0.026	0.127	0.0001	0.090	0.193	0.148	0.029	0.125	0.001	0.090	0.192	0.146
Cons	-4.233	4.705	6.799***	1.143	-2.213	4.438	-2.504	4.289	7.131***	1.186	-1.881	4.319
Year dummies	Yes		Yes		No		Yes		Yes		No	
Industry dummies	Yes		Yes		No		Yes		Yes		No	
Number of clustered firms	130.000		130.000		130.000		130.000		130.000		130.000	
R <sup>2</sup>	0.180		0.180		0.280		0.200		0.670		0.300	

Tobin's Q is the market value of common equity plus the book value of preferred equity and long-term debt divided by the book value of assets, Independ is the percentage of independent directors in the board; Bsize is the board size measured by number of directors in the board; Inown is the percentage of institutional ownership; CPS is the CEO pay Slice measured as the percentage of the total compensation of top-five executives that is captured by the CEO; ECPS is the equity-based CEO pay Slice measured as the percentage of the total equity-based compensation of top-five executives that is captured by the CEO; Cgidum is a dummy variable that takes one for observations with their value of corporate governance reporting index above the sample mean, zero otherwise; Interaction is the interaction between CPS and Cgidum; Interaction2 is the interaction between ECPS and Cgidum.  $Bsize^2$  and  $Inown^2$  are the squares of the board size and percentage of institutional ownership, respectively; Lev is total debt to total asset ratio; ROE is net income to total equity ratio; MB is market to book ratio; Size is natural logarithm of total assets; Risk is measured by firm's historical beta; Capexp is ratio of capital expenditures to total assets. Standard errors are clustered at firm level.

\*\*\*, \*\*, \* indicate the coefficient is significant at 1 %, 5 %, and 10 % levels, respectively.

Table 5: Regression results with ROE as the dependent variable

Dependent Variable: ROE	(1)		(2)		(3)		(4)		(5)		(6)	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Intercept	-17.757	17.570	-14.312	15.245	-20.498	17.553	-16.593	16.893	-14.047	15.403	-20.316	18.380
Bsize	18.063	19.694	0.788	0.771	18.016	16.967	13.835	19.115	0.747	0.769	20.672	18.064
Inown	0.091	0.543	-0.054	0.075	0.300	0.528	0.116	0.524	-0.052	0.075	0.297	0.554
CPS	20.823**	8.647	17.036*	9.848	20.023**	9.785						
ECPS							15.516**	7.169	14.334	9.162	16.528***	9.181
Cgidum	3.444	5.035	4.390	4.045	4.595	5.085	2.705	5.024	3.700	3.928	2.944	5.305
Interaction	-17.794*	10.362	-15.188	10.123	-19.677*	10.664						
Interaction2							-14.719	9.990	-13.453	9.799	-16.634	10.552
bsize <sup>2</sup>	-0.953	1.054			-0.962	0.903	-0.730	1.023			-1.107	0.961
inown <sup>2</sup>	-0.005	0.010			-0.008	0.011	-0.005	0.010			-0.008	0.011
Lev	-13.365	12.754	16.727**	8.061	-9.584	10.849	-14.566	12.540	16.649**	8.090	-8.601	11.344
capexp	1.930	41.792	-9.966	30.270	5.317	35.761	-1.713	40.162	-10.158	30.266	7.297	37.286
Mb	2.926***	0.477	2.964***	0.411	2.852***	0.537	2.941***	0.454	2.974***	0.410	2.874***	0.554
Size	-0.102	6.642	2.318	4.115	2.600	5.414	0.875	6.536	2.386	4.113	2.171	5.553
Risk	-4.299**	2.013	-3.906**	1.964	-3.555	2.300	-4.291**		-3.892**	1.963	-3.453	2.317
cons	-59.798	61.016	-4.338	25.111	-74.130	64.913	-46.033	58.870	-3.480	25.065	-82.114	68.507
Year dummies	Yes		Yes		No		Yes		Yes		No	
Industry dummies	Yes		Yes		No		Yes		Yes		No	
Number of clustered firms	130.000		130.000		130.000		130.000		130.000		130.000	
R <sup>2</sup>	0.200		0.270		0.095		0.230		0.270		0.070	

ROE is ratio of net income to total equity; Independ is the percentage of independent directors in the board; Bsize is the board size measured by number of directors in the board; Inown is the percentage of institutional ownership; CPS is the CEO pay Slice measured as the percentage of the total compensation of top-five executives that is captured by the CEO; ECPS is the equity-based CEO pay Slice measured as the percentage of the total equity-based compensation of top-five executives that is captured by the CEO; Cgidum is a dummy variable that takes one for observations with their value of corporate governance reporting index above the sample mean, zero otherwise; Interaction is the interaction between CPS and Cgidum; Interaction2 is the interaction between ECPS and Cgidum. Bsize<sup>2</sup> and Inown<sup>2</sup> are the squares of the board size and percentage of institutional ownership, respectively; Lev is total debt to total asset ratio; MB is market to book ratio; Size is natural logarithm of total assets; Risk is measured by firm's historical beta; Capexp is ratio of capital expenditures to total assets. Standard errors are clustered at firm level. Some of the R<sup>2</sup> are not reported as the regression doesn't provide them for the 2SLS system.

\*\*\*, \*\*, \* indicate the coefficient is significant at 1 %, 5 %, and 10 % levels, respectively.



Table 6: Regression results with sub- index related to board, compensation and takeover

	(1)		(2)		(3)		(4)	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Board-sub	0.026**	0.012	0.023*	0.013	0.029*	0.013	0.024*	0.014
Compensation-sub	-0.014	0.011	-0.018*	0.010	-0.012	0.011	-0.014	0.012
Takeover-sub	0.0001	0.013	0.004	0.010	-0.001	0.015	0.010	0.012
CEOTen	0.001	0.002	0.001	0.002	0.0001	0.002	-0.001	0.003
CEOChair	-0.100	0.064	-0.105*	0.061	-0.096	0.069	-0.097	0.066
CEOGen	-0.049	0.038	-0.063**	0.033	-0.051	0.041	-0.061	0.040
Inown	0.001	0.002	0.002	0.002	0.001	0.002	0.002	0.002
Independ	0.382***	0.090	0.398***	0.090	0.394***	0.097	0.419***	0.096
Bsize	-0.091***	0.035	-0.095**	0.037	-0.086**	0.041	-0.093**	0.042
Bsize <sup>2</sup>	0.003*	0.002	0.004*	0.002	0.003	0.002	0.003	0.002
Inown <sup>2</sup>	0.0001***	0.000	0.0001	0.000	0.000	0.000	0.000	0.000
Lev	0.003	0.092	-0.033	0.084	-0.004	0.103	-0.100	0.132
MB	-0.002	0.005	-0.002	0.004	-0.003	0.005	-0.004	0.005
Tobin	-0.009	0.015	0.002	0.015	-0.008	0.016	0.011	0.020

ROE	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000
Capexp	0.024	0.387	0.122	0.362	0.025	0.413	0.343	0.525
Size	0.024	0.032	0.042	0.037	0.028	0.035	0.074	0.064
Risk	-0.001	0.014	-0.003	0.014	-0.005	0.015	-0.008	0.016
Cons	0.656***	0.252	0.549**	0.278	0.618**	0.283	0.325	0.455
Year dummies	Yes		No		Yes		No	
Industry dummies	Yes		No		Yes		No	
Number of clustered firms	130.000		130.000		130.000		130.000	
R <sup>2</sup>	0.290		0.140		0.330		0.190	

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Models 1 and 2 have CPS as a dependent variable and Models 3 and 4 use ECPS as dependent variable; board sub is the sub-index for the corporate governance index related to the board; compensation Sub is the sub-index for the corporate governance index related to compensation; takeover sub is the sub-index related to takeover; other variables are defined as in table 1.

\*\*\*, \*\*, \* indicate the coefficient is significant at 1 %, 5 %, and 10 % levels, respectively.